The CHEMIST

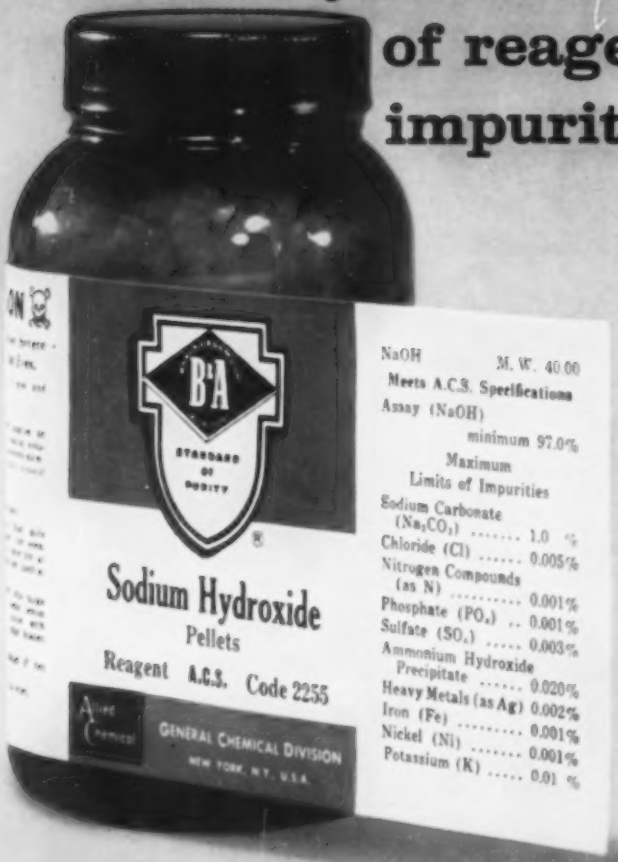
November, 1961

Dr. Alvan H. Tenney (left) and Samuel Schenberg (center) accept Honor Scrolls from Dr. John L. Hickson, Chairman of the New York AIC Chapter.

(See page 417)

Volume XXXVIII Number 11

What's your measure of reagent impurities?



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Deadlines for THE CHEMIST: For the December issue the deadline is Nov. 15.

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To Come in December

Always, in this festive month, THE CHEMIST features the young people who have received AIC Student Medals during the year. These students have been invited to participate in an essay contest for a prize of $100.00. The Committee on Student Medals is now judging the papers received. We hope for their decision in time to publish the prize winning essay in this issue . . . Other articles will include two papers presented at ceremonies when student medals were awarded: "The Chemist's Ethics and the Community," by Irving Michelson of Consumers Research, Mt. Vernon, N. Y. (at the New Jersey Chapter Meeting), and "Education for Excellence—a Price of Freedom," by Dr. Arthur Osol, F.A.I.C., of the Philadelphia College of Pharmacy and Science, Philadelphia, Pa. (at the Philadelphia Chapter Meeting) . . . Dr. Ernest H. Swift of California Institute of Technology recently received the Honor Scroll of the Western AIC Chapter. His paper is entitled, "Challenges to College Chemistry Curricula."

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Our Plans For Action

Dr. Johan Bjorksten, F.A.I.C.
AIC President

(A report to the AIC membership on the Council Meeting of September 25, 1961)

AT the Council Meeting, September 25, the activities of the AIC were discussed. It was agreed that to be effective, the AIC should concentrate on not more than two activities at a time; efforts on these should be coordinated and synchronized so that the Chapters work in unison. The Committee on Chapter Activities should consider this in providing suitable material and in coordination.

Among areas on which the AIC might focus attention, the following were discussed: Education, Aging and Health, Unions, Competition with research done abroad, Discrimination. The Council decided unanimously to concentrate activity during the current year on Education, stressing the professional aspects, and on Aging. The Chapters are encouraged to stress these subjects in every possible way during the current year. The Committee on Chapter Activities, (of which Dr. Henry L. Weisbecker is chairman, and Dr. C. E. Feazel, Dr. B. S. Friedman, Dr. W. S. Guthmann, Dr. L. A. Hall, B. E. Schaar, and C. E. Thorp are members) and the Committee on Public Relations (of which Richard L. Moore is chairman, and A. B. Allen, Mrs. Thelma C. Heatwold, James E. Henning, Merritt L. Kastens and Robert K. Neuman are members) will assist the Chapters in these efforts. The decision was preceded by discussion, from which emerged the following analysis, and the reasons for the decision:

Education

In the large majority of educational institutions, not enough, if any, instruction is given on professional duties and opportunities for the chemist and the chemical engineer. In this regard, we lag behind, for example, medical education, where professional aspects are more adequately stressed. Special courses in professionalism are not the recommended solution. Rather, the Committee on Education should work out proposed five to ten minute talks or illustrative anecdotes on subjects related to professionalism and ethics, which can be readily worked into lectures. The AIC will make such material available to teachers of chemistry at colleges and universities. This material will be sent to the Chapters, which best know where and how it should be used in their respective areas.

Additional recommendations may emerge from a committee appointed for this purpose, which is to report to the Council at its next meeting, November 13th. This committee consists of Dr. W. E. Hanford, Hon. AIC, and Dr. William J. Sparks, Hon. AIC.

Aging and Health

On aging, it was the unanimous feeling of the Council that research in this field, largely guided by persons without advanced training in chemistry, is neither well-focused nor adequately supported. As a result the substantial funds available are not used where they would be most likely to bring results. The Chapters are requested to use every opportunity, as a group or as individuals, to exert their local and general influence toward bringing about:

(1) Public realization that aging is a biochemical process subject to control.

(2) Public demand that funds allocated for health research be directed to research to clarify the basic chemistry of aging, with a view to practical application.

(3) Public demand that such funds not be diverted nor squandered on projects which could not by any stretch of the imagination result in such control of aging.

(4) Presentation of pertinent facts to persons within the sphere of contacts of the Chapters, who are in a position to exert influence politically, administratively, or academically, to advance basic biochemical work on aging with a view to its ultimate control.

The Committee on Aging and Health was instructed to take all pertinent steps to implement this matter, and to prepare material for use on the Chapter levels. In the meanwhile, as instruction, the Chapters are referred to the articles in THE CHEMIST of December 1959, page 437; January 1961, page 11; Feb. 1961, page 57; May 1961, page 173.

The above two areas were singled out for concentrated action during this year. The following three areas, while within the framework of the AIC, were considered at this time less in need of concentrated attention, and action on them was therefore subordinated to a concentrated drive on Professional Education and on Aging.

Unionism

Your Council took note of the fact that the unions are preparing systematic drives to increase their membership in the "white collar" groups, and particularly in the technical fields. We are always open to discussion on this subject, and a proponent for unionism who would like to present his side is welcome to debate at our meetings. Our official position, however, which has crystallized after many such discussions, is that unionism is undesirable generally for the professional chemist. The chemist who joins a union succeeds only in substituting one set of managers for another. He does not in that manner achieve what he wants: Individual freedom and professional responsibility. The Council will follow events, but at this moment plans no action.

Research Abroad

Research results are free from duty and research salaries in most foreign countries are one-half to one-third of what they are in the U. S. Many industries and non-profit institutions have founded laboratories abroad, in which they have research done at salaries we could not live on. The effect, present and potential, on the remuneration for chemists in the United States has not been determined. The Council has taken steps to secure detailed statistical information on this trend, which will enable us to decide which, if any, steps may be indicated. No other action is envisaged at the present time.

Discrimination

It is the traditional position of the AIC that a chemist or chemical engineer should be judged or employed on the basis of his skill and ethics as a professional and on his desire and ability to cooperate with his fellow workers—and on no other basis. Such specific problems as have arisen have been handled on a local level by the Chapters or by the Committee on Professional Relations. No Council action in this area appears required at this time.

Summary

Thus, the decision was to concentrate major efforts on the fields of Professional Education and on Aging, and to be ready to handle problems in other areas as they arise but to avoid dispersion of efforts. The Council was unanimous in this decision.

If any AIC member disagrees with the Council decisions, or has any suggestions or comments, he is invited to write to the Council, in care of THE CHEMIST. Such letters will be published, particularly if presenting divergent views, if pertinent and not too long. The Council acts on what it believes to be the best interest of the majority of the chemical profession; it depends for its guidance on expressions from the membership.

Will "Confidential Reports" Be Honored

Also, at the September 25 Council meeting, Dr. Wayne E. Kuhn reported a situation which could have serious implications for chemists, as it could result in a loosening of the hereto inviolate secrecy of pending patent applications. The Federal Trade Commission under authority of the FTC act wants St. Regis Paper Co. to produce file copies of reports submitted as confidential information to the Bureau of Census. St. Regis refused, and was ordered to comply by two lower courts. The case is now before the Supreme Court which has agreed to hear it. This case will be argued during the Fall session of the Court.

If the Supreme Court should make a ruling opening confidential information to any other government bureau that requests it, this would concern us. Almost any professional chemist has, has had, or hopes to have patent applications. If the information contained in a patent application is spread out, and the application is then refused or limited so as to give no protection, then very severe injury could be done to the inventor by depriving him of the second alternative, that of secret practice. And while the Seventh Circuit Court commented that assurance of confidentiality constitutes a pledge of good faith on the part of Government as a whole, it is obvious that the efficiency of such a pledge is greatly reduced if the information that represents a great value to an individual inventor or a firm can be spread out over many millions of government employees, many of whom have much less rigorous indoctrination and understanding of secrecy than the traditionally highly reliable staff of the Patent Office.

This is a case which will be followed closely. The Council would welcome expressions of the thought of the membership on this. Letters which make a point tersely will be published in THE CHEMIST.

Special AIC Announcements

Nominations for Gold Medal Requested

The AIC Gold Medal is awarded annually for "noteworthy and outstanding service to the science of chemistry or the profession of chemist or chemical engineer in the U. S." The Committee on Gold Medal Award, of which Dr. Emil Ott, former AIC president, is chairman, invites AIC members to suggest candidates for consideration for this award. Please send your suggestions to Dr. Ott, at 56 Greenhouse Drive, Princeton, N. J.

To All Councilors

The next meeting of the National Council will be held Monday, November 13, 1961, at the Chemists' Club, 52 E. 41st St., New York 17, N. Y. The Board of Directors will meet at 5:00 p.m., and the Council at 5:30 p.m.

Chemical Profession of Cleveland Dinner

The Chemical Profession of Cleveland, Ohio, will hold its 13th Annual Dinner, Nov. 14, at the Cleveland Engineering & Scientific Center. (See Professional Appointments). Representatives of the Ohio Chapter of the AIC, one of the sponsoring societies, on the dinner committee are John O. Hay, F.A.I.C., of Harshaw Chemical Company and Einor E. Lund, F.A.I.C., of International Rustproof Corporation, both of Cleveland.

Action on Behalf of Research Chemists

Senate Bill S. 1552, the Drug Industry Anti-Trust Act, if enacted, would seriously curtail opportunities for research chemists in the pharmaceutical industry and in some other fields. AIC President Bjorksten testified on behalf of research chemists at the hearings on this bill, Oct. 16. For an analysis of this bill and some of Dr. Bjorksten's testimony, see the Report of the Committee on Legislation, page 393.

Piedmont Chapter Officers

The Piedmont Chapter announces that the following officers will serve for the 1961-62 season:

Chairman, Albert B. Allen, 1159 Harrogate Lane, N.E., Atlanta 19, Ga.

Chairman-elect, Charles E. Waits, 3504 Rock Drive, Doraville, Ga.

Secretary-Treasurer, Samuel L. Norwood, III, 1445 Monticello Way, College Park, Ga.

Representative to National Council, Dr. Ivy M. Parker, Plantation Pipe Line Co., P.O. Box 1743, Atlanta 1, Ga.

1963 Annual Meeting

The 40th Annual Meeting, to be held in May 1963, will be held in Philadelphia, Pa. Dr. E. M. Kipp, 161 Hunters Lane, Devon, Pa., and Marcus Sittenfield, 1405 Locust St., Philadelphia, Pa., will be the joint chairmen of the arrangements committee for this meeting.

New Officers for the Ohio Chapter

The Ohio Chapter announces the election of the following officers:

Chairman, Dr. Thomas Sumner, 484 Hampshire Road, Akron 13, Ohio.

Chairman-elect, George W. Blum, 184 Ernest Drive, Tallmadge, Ohio.

Secretary-treasurer, W. J. Krantz, 199 Pfeiffer Ave., Akron 12, Ohio.

Report of the Committee on Legislation

Analysis of S. 1552—Drug Industry Anti-Trust Act

THIS bill, if enacted, would provide for major changes in our patent system, the Sherman Anti-trust Act, and the Federal Food, Drug and Cosmetic Act. The implications of this legislation are so broad as to have a serious impact, not only on the drug industry, but also on other chemical process industries.

Briefly, this bill, if enacted, would bring about several basic changes in the patent system through:

1. Provisions creating special conditions of patentability.
2. Extremely broad definition of "drug," covering many more chemicals than those generally considered to be drugs.
3. Drastic limitations of period of time for exclusive license.
4. Alteration of effective date of drug patents.
5. Provisions for compulsory licensing.

These changes would not be in the public interest and they are clearly not in the best interests of the professional chemist or chemical engineer. In addition, there are other undesirable features of S. 1552, such as the proposed amendments to the Sherman Anti-trust Act, which would make some types of interference settlements *per se* violations of this Act, and the amendments to the Federal Food, Drug and Cosmetic Act which would require special naming of drugs by the Secretary of Health, Education and Welfare, special labeling of drug containers, and special licensing of drug manufacturers.

The bill introduces an entirely new concept in the determination of patentability of a drug application. Not only would the application be judged on the basis of novelty, but also upon a determination that "the therapeutic effect . . . is significantly greater than that of the drug modified." Thus a governmental department other than the Patent Office would become involved in decisions on patentability. This would introduce confusion and uncertainty in prosecution of patent applications; would essentially transfer authority for issuance of drug patents from the Commissioner of Patents to the Secretary of Health, Education and Welfare, and generally would be impracticable to enforce.

The most valuable therapeutic usefulness of a drug may not be known at first; so if its therapeutic value becomes an important criterion of patentability, the number and variety of drugs offered for medical use will decrease. Research and development on new drugs would be greatly reduced and the opportunities for professional research chemists would be restricted. Not only would this result in harassment of chemists and chemical engineers, but the medical profession and the public would suffer as well.

The bill would make molecular modification of a drug unpatentable unless it could be shown that the modification would not have been obvious to one skilled in the art or that the Secretary of Health, Education and Welfare had determined that the therapeutic effect of the modification is significantly greater than that of the drug so modified. First, no patent for any invention should be issued for an "obvious improvement"; if such patents are allowed, the patent examining practice should be investigated. The means of correction are already in the hands of the Patent Office and no special legislation is necessary. Second, the criterion of greater therapeutic effectiveness is vague and imprecise, would be difficult to administer, and should not be introduced as a guide to patentability.

The time period in which the patentee would have the right to issue exclusive licenses for drug patents would be drastically altered from 17 years to 3 years, followed by complusory licensing. The real value of a patent lies in the privilege it gives the owner to prevent others from using the invention without the patentee's permission. This right of exclusive licensing is frequently the most practical means whereby the invention can be promoted, developed, and commercialized.

The principle of complusory licensing is completely at variance with the basic tenet of the patent system; that of the patentee's exclusive right to prevent others from using the invention. The matter of compulsory licensing is in no way a new one; it has been before Congress on numerous other occasions. With one exception, Congress has heretofore refused to approve compulsory licensing, doubtless because it would destroy the basic right inherent in a patent.

The AIC contains so-called "bench chemists" and employers or administrators of chemists, and this bill would have an impact on both these groups. The regulation of one industry in the fashion proposed by S. 1552 could not help but drive chemists and chemical engineers to less regulated segments of industry, and because of the nature of the particular industry concerned, there would result disadvantages to the general public and personal losses to members of the chemical profession.

President Bjorksten Testifies at Hearings on S. 1552

Dr. Johan Bjorksten, AIC president, testified at hearings on Senate Bill S. 1552 before Senator Kefauver's Antitrust and Monopoly Subcommittee, October 16, in Washington, D.C., on behalf of research chemists. (His testimony was reported in *The New York Times*, Oct. 17, 1961, under the heading, "Chemists Defend Patents on Drugs.")

Some of the points made in Dr. Bjorksten's testimony were:

"If Thomas Edison were here today, he could not make a living devising and selling chemical inventions as an individual. In a desire to prevent domination by large business, the powers that be have strangled the individual professional inventor in chemistry. Having lost the opportunity for private invention as a paying profession, where can the medical chemist go who finds stirring within him the urge of an idea, the inspiration that could lead to the cure of cancer or heart disease . . . There is no place left for him but the research laboratories of the pharmaceutical industry. It would be a tragedy for the professional chemist if these last havens for the inventive spirit were to be drastically restricted in the way that would inevitably result if S. 1552 were to become a law . . .

"Think of the legal conflict that would arise in arguing whether a new drug has therapeutic superiority, if it has only 90% of the efficacy of an old drug, but is free from some side effect; is ten times cheaper to make, or perhaps merely tastes better or is easier to administer! In each of these regards there will be twilight zones of uncertainty . . .

"Another provision of the bill, that of only 3 years exclusivity for patents followed by complusory licensing, does not take into account the long time between invention and marketing that is necessary for development. It has been said that 4 years is a normal time for this transition; in my experience the time has been much longer . . . The odds against any single invention panning out are so very long that all of the period of protection now allowed is needed to warrant the research chances that are being taken. It is those research efforts that we have to thank for most, if not all, of the practical progress in pharmaceutical science to date . . .

"Then, too, the definition of a drug, as accepted in S. 1552, is so broad as to be completely unworkable for purposes of the patent system. Under this definition, salt and water would be included! In that situation, the constitutional property rights of the chemist in his inventions, as now protected by our patent system, would be jeopardized. Every chemist's salary is dependent upon this right . . .

"Evaluating the proposed legislation from the standpoint of the professional chemist, the AIC is convinced that the steps proposed in S. 1552 would fail to achieve the results intended. They would reduce the investment in both chemical and medical research. They would reduce opportunities for professional chemists by reducing the rewards for invention which are now used to pay their individual rewards . . . They would introduce time lags which are more discouraging than anything else for the man in creative pursuit of a research goal. They would drive the most creative chemists away from pharmaceutical research into other industries not similarly hampered.

"If compulsory licensing comes about, the pharmaceutical companies will rely more on advertising, less on research. This is contrary to the best interests of research chemists, and I submit, also contrary to the best interests of the public. Any degree of complusory licensing would reduce the fiercest and most beneficial competition—the competition between laboratories."

In concluding his testimony, Dr. Bjorksten pleaded, "Let us not, in an effort to regulate one industry, curtail the last opportunities of the practical, creative, medico-chemical scientist to function in a congenial team effort where creative invention is encouraged and directly and liberally rewarded."

Changing Science Patterns in the 1960's

Samuel Schenberg, F.A.I.C.

Director of Science, New York City Schools
Board of Education, 110 Livingston St., Brooklyn 1, N. Y.

(Presented, here slightly condensed, when the author and Dr. Alvan H. Tenney received Honor Scrolls from the New York AIC Chapter, May 25, 1961, for their contributions to science education in New York, N. Y.)

THE two preceding decades have witnessed scientific breakthroughs in our understanding of the nucleus of the atom and in the probabilities of harnessing and unleashing gigantic amounts of its potential energy. At once it was apparent that we had uncovered a force that, if uncontrolled, could destroy large segments of the human race, but if controlled, could be used to overcome want and misery over the face of the earth. Faced with such alternatives, is it any wonder that all people are more concerned with the uncontrolled certainties than with the controlled possibilities?

It is in this climate of uncertainty and urgent national needs, as President Kennedy has said, that we are fashioning a program of science education for our students in the 1960's. When one attempts to embark upon a course of action calculated to improve science instruction, he becomes aware of the existence of problems and the need for solving them simultaneously or in successive stages as the current situation dictates. On-the-job or in-service training was tackled first.

Some five years ago, we became aware that advances in science were being reported in our scientific journals, newspapers, magazines, radio, and television, in such profusion that children were being bombarded with a language that many science teachers could only vaguely understand and could not explain. We then organized all-year institutes for science teachers in the metropolitan area to bring them up-to-date in their science specialty. The first was held under the auspices of New York University, Washington Square College, for two years, and registered 100 high school teachers of science each year. We turned away twice that number. These Institutes were made possible by a generous grant from the Esso Education Foundation. During this time the National Science Foundation inaugurated its program for the in-service training of high school science teachers across the country in a large number of summer institutes, and some all-year institutes . . .

A second important problem was the efficacy of the science programs in our high schools and the science facilities designed for their implementation. This called for an evaluation by experts. I turned to our scientific

societies for assistance. In 1958 a series of exploratory meetings were held with representatives of the ACS, AIP, IRE and the New York Academy of Sciences. This Committee sought ways and means to improve our high school science program. It consisted of Dr. Ronald L. McFarlan, the president of IRE; Dr. W. C. Kelly, executive director AIP; Dr. M. J. Kopac of the New York Academy of Sciences, and Dr. Hammett of the ACS. Others also met with this Committee. Then operating committees were appointed by each of these societies to investigate the actual conditions in our schools.

One of these operating committees was headed by Dr. Alvan H. Tenney, whose contributions to education are recognized by the New York AIC Chapter. I extend my thanks to Dr. Tenney and the distinguished members of his committee for their painstaking efforts to improve chemistry education in the high schools of New York City. Their work culminated in a report, May 10, 1960, which was reported in the press. Similar reports were made by the physics and biology committees. The painstaking evaluation and the thoughtful constructive suggestions in Dr. Tenney's report have struck a responsive chord among our high school science teachers.

One crucial recommendation of this committee was the need for adequate laboratory time. We are concerned with the desirability of providing at least 80 minutes of laboratory experience each week instead of the present 40-minute allotment. This added time allotment requires the hiring of more teachers, because instead of teaching 5 classes for 5 periods per week, the teacher would be programmed for its equivalent or 4 classes for 6 periods per week. The double laboratory period, which all of us agree is extremely important, therefore calls for a 25% increase in our science teaching staff, and consequently falls into the lap of budget makers. To win this battle we need more real support from people who can speak with authority—the members of our scientific societies. I would like to see a double laboratory period made mandatory for all students who are studying a laboratory science in our schools . . .

A third important problem involves the nature of the science course offerings. All of our science courses were revised and put into effect on a state-wide basis in 1957. The evaluation committees felt that our science teachers attempted to cover too much ground. They recommended less subject matter and greater exploration in depth. They recommended that these courses be brought up-to-date. There are now four important modifications of offerings in high school science in varying degrees of develop-

ment on a national basis. These are the PSSC, the Chem Study, the CBA and the BSCS. These have tremendous resources in men and money at their disposal. School systems across the country are experimenting with these proposed courses of study and are feeding back to the committees the results of their classroom experimentation. This classroom research represents a gigantic step forward in syllabus construction. We are now experimenting with PSSC and the Chem Study. This Fall we will introduce BSCS in nine of our high schools.

We may ask, if we solve the three problems alluded to, will the science program in our schools reach a level consistent with the needs of science education in the 1960's? Recently Senator Morse of Oregon said, "We can't keep ahead of Russia in manpower but we must keep ahead in brainpower." Will what we have considered thus far insure the brainpower so necessary for leadership? I do not think so. These programs do not go far enough to offer us this needed assurance.

Let us agree upon a premise involving the answer to the question, "For whom is the improvement of the scientific enterprise designed?" A full life in the 1960's requires all of our citizens to possess a high degree of scientific literacy. In such a climate citizens can then understand and evaluate the role of science in their daily lives and in the future of our country. Today's students are tomorrow's adults . . . Is it feasible to assume that adequate schools and good teachers in such a climate would enable us to nurture an adequate supply of future scientists and engineers without any difficulty? If we agree on our answers to both questions, it follows that science education today is faced with a dual mandate, namely, to meet the needs of both groups—that of the citizen and that of the citizen scientist. How to accomplish both presents the critical problems that the scientific enterprise must solve.

It seemed logical that science education could be strengthened and accelerated through the introduction of a continuous, sequential science program that would start in the kindergarten and would proceed step by step through the high school. This called for the introduction of a fourth "R" into the elementary school curriculum, into schools that have no licensed science teachers. We started a movement in this direction in New York City about 7 years ago. The introduction of a new science program of this magnitude (16,000 elementary school teachers and 600,000 elementary school children) presents an anomalous situation. The child is not aware of any change in his program, so that if a stumbling block arises, it rarely is the child. Instead, it often turns out to be the

teacher, and is very often not of his making. Elementary school teachers were not conditioned by schools of education to meet this need. We need to revamp the science preparation of all future elementary school teachers.

A new program must provide new tools with which to fashion it. It is not uncommon in industry that a plant will shut down, even for an extended period, in order to re-tool. Yet we expect teachers to introduce a new program overnight, with or without adequate background or experience for it. It would be highly desirable if we could take groups of teachers out of their classes, in rotation, for an extended period and send them back to college for retraining. This would ensure the proper introduction of new courses of study. However, this suggestion is not attainable at this time. We are compelled to solve our problems in the climate in which we live, and with the resources at our disposal.

In order to train our elementary teachers in science so that they would be able to introduce the K-6 portion of our science program, we introduced a TV science workshop, in which more than 5,000 elementary school teachers enrolled, voluntarily, in 284 school centers. Each Tuesday afternoon the course started with a one-half hour telecast at 3:00 p.m. over Station WPIX, Channel 11. Each telecast was immediately followed by a 1½ hour workshop for the teachers on their own time, during which they handled science equipment and performed science experiments for the first time in their lives. The project was a great success. It ran through 29 performances, and since it was an open TV program, we estimated that at least 100,000 people watched it every week. The in-service course will be repeated this Fall.

The formulation and completion of the K-6 portion of the total science program will provide us with a firm foundation upon which to build the rest of the science curriculum. The elementary school graduate in 1964 and thereafter will be scientifically literate and scientifically accelerated for his age, and will thus differ from his American counterpart in previous decades. (The first interplanetary traveler is studying the 4 R's today in one of the elementary schools in this country.) This constitutes the first part or foundation of our K-12 science program.

Almost all of the subject matter that constitutes our present junior high school, general science course is in the K-6 science curriculum. We have found that elementary school youngsters can understand junior high school science concepts when they are presented to them in a language they can comprehend. In addition, the K-12 science program and the age in which we live call for the mandation of science in all grades as a major

subject from the kindergarten through the high school. These two simultaneous events, represented by the movement of the present junior high school science content into the elementary schools, and by the increase in time allotments for science in grades 7 and 8, present us with the probability of an almost complete vacuum, as far as science is concerned, in the grades now occupied with the present course in general science in grades 7, 8 and 9.

We have arrived at a tentative consensus to bring into the junior high schools, on an experimental basis, much of what is now found in our high school courses in biology, chemistry, physics and earth science. The new approach will enable the child to explore each science field at progressively higher levels and to utilize the cross-fertilization of ideas that are fostered by such an arrangement. It will tend to eliminate excessive duplication and will enable the students to investigate more deeply each of the scientific fields.

In the future, it is entirely possible that much of what is now in our present freshman and sophomore science courses in college will be found in our high schools, as a direct result of this prior continuous, sequential science preparation in the earlier grades. You may be surprised to learn that more than 1,000 of our high school students are enrolled in advanced placement courses in the New York City high schools, for which a great many will receive college credit in science and mathematics when they enter the colleges in September.

In conclusion, the formulation and implementation of a K-12 science program will not only increase the scientific literacy of our general population to a great extent, but this program will also interest more of our youngsters to seek careers in scientific fields in greater numbers than are found at present. These youngsters will enter college on a science level equivalent to those now entering their junior year in college. These are some of the changing patterns which constitute our answer to the challenge facing science in the 1960's.

(For the citations on the Honor Scrolls to Dr. Tenney and Mr. Schenberg, see page 417.)

The Seattle World's Fair will begin April 21, 1962, and will feature man's life of tomorrow as it may develop "from his industry and ingenuity today." For information, Century 21. Exposition, Inc., Seattle 9, Wash.

The name of the American Society for Testing Materials has been officially changed to the American Society for Testing *and* Materials. Its address is 1916 Race St., Philadelphia 3, Pa.

Short-Term Objectives Waste University Talent

WHEN Dr. Max Tishler, F.A.I.C., president, Merck Sharp and Dohme Research Laboratories, Rahway, N. J., received the 1961 Medal of the Industrial Research Institute, for "dynamic leadership in industrial research and development," he said, in his acceptance address, that American universities are being turned into "mere discovery factories" by the $900 million a year the Government spends for scientific research on the campus.

"Top talent in our universities is being wasted on short-term objectives" to the detriment of teaching and free inquiry. "Unless university researchers devote more time to teaching future scientists, the wells of discovery will eventually dry up. Then science will no longer be able to grow at the pace the nation needs in an era when the postponement of discovery may mean the twilight of freedom."

"To restore the proper emphasis to teaching and to the atmosphere of complete freedom in research within the university," Dr. Tishler urged that Government research and development directed at specific problems be separated from the campus. Instead, "The universities should be provided with funds for free, creative, and self-stimulated pursuit of new knowledge."

He also recommended that Federal appropriations be spread far more widely "in order to build the science capacities of an increasing number of institutions and to make excellence in both research and teaching available to a higher proportion of our next generation of students." He pointed out that 5 institutions received nearly 60% of all Federal funds for college and university research, and that only 287 out of a total of 1,940 U. S. institutions of higher learning received any Federal funds for research in fiscal year 1959. He suggested that Federal research programs oriented toward specific goals be handled in separate research institutes administered either by universities or private organizations.

In Our Atomic Future, Scholars Must Teach

Dr. W. F. Libby, Nobel Laureate

Professor of Chemistry, University of California at Los Angeles, Calif.

(Excerpt from a talk on "Our Atomic Future," presented at a meeting of the Western AIC Chapter.)

OUR atomic future—by which we mean the future as it will be inextricably linked to the atom—is now unfolding and the features and facts governing it need general consideration. Let us mention some: (1) the power of the atom for peaceful good is just being tapped. Its potentiality is just now being realized. Great and omnipotent as it has proved to be in warfare, its preeminence in peaceful applications may be just as great. (2) The resources of the world necessary for the atom are enormous and we need not really worry at this time about their exhaustion. (3) As the population of the world increases, the supply of the brilliant people necessary to make the difficult steps forward, to bring out the full potentialities of the atom, is increased. And so the rate of acceleration of our technological development will probably be maintained; in other words, an explosive deluging of the world with new technology and new horizons, the discovery of new aspects of nature, will characterize our atomic future.

The problem of maintaining quality in intellectual activities in the face of the population explosion is one of the great problems of our time. It is one of the new problems the world faces to get accustomed to sheltered leisurely scholarship. We must preserve this, but at the same time, scholars have a commanding and overwhelming responsibility to transfer their knowledge to the thousands of students being born in the next generation. In other words, learned people now must be public figures in order that the knowledge be transmitted in the face of the enormous increase in the population. More succinctly, all the state universities have the responsibility of educating the students who qualify. These numbers are enormous. The constant cry is, "Where will we obtain the faculty?" The answer is, "There are no possible expansions of the faculty beyond the limits of those who are learned, and it is the nature of the population explosion that the explosion of knowledge will follow it, and the dissemination of knowledge will be a limiting process." In other words, education is a most vital process.

Now the most serious of all the questions is whether in the face of this demand it is possible for the scholar to continue to function and, by coordinating and correlating, increase the total store of human knowledge. There is so much now known that was not known a generation ago that it is ex-

tremely difficult at the present time, at least in the sciences, to teach an up-to-date course unless you are actively doing research in the field. The textbooks are out of date and only a constant and persistent and interested reading of the literature makes it possible to give an up-to-date course in science. We come to the conclusion that at least on the university level, the teacher must be doing research—he must be a scholar. Now you might say it would be possible to make teachers colleges which would train professional teachers to do the work, and thereby take care of the numbers problem. This is what is being done in many places, but without success, for the reason that they do not have the knowledge to transmit. The knowledge is not in the textbooks.

You may say that it is not important that the students be kept up-to-date. I insist that it is, in view of the rapid expansion of our population. Whole technologies are born in the four years of an undergraduate's tenure. He can well go to a school that has no mechanism for keeping courses up-to-date beyond the time of printing of textbooks. He can well go the whole of time without even learning of the existence of such major developments. For example, recently at the Bell Telephone Laboratories a great research was completed, owing to the suggestion of a Swiss scientist who came to America, Berndt Matthius. What he has done is this: He makes it possible to transmit electric current without heating the wire. Why is that important? One of the problems in distribution of electricity is the conduction losses in the wire. It is not possible to use electric power more than about 300 or 400 miles away from the source because of the losses in transmission. With this new type of wire, expensive as it is, it will be possible to maintain magnetic fields with a power source the size of an automobile battery, which, with present technology, is as big as a power station for a good-size city. In the outer reaches of space, where we have naturally very low temperatures, and it is the condition of Dr. Matthius' wire that it be kept very cold, it would seem clear that his kind of completely cost-free transmission would be easy to use. Now, who knows that superconductivity is important? I think everyone should, because it will affect the course of our daily lives. Why is it important that the undergraduates know? Well, it is probable that if they do know, they can get a better job and also they can earn the salary they are paid, being paid better, but most important of all, it will be part of a most exciting intellectual endeavor. Research in the sciences is and consists of the attempt to make new discoveries. It is in the research area that the most interesting events occur.

So the rate of acceleration of our technological development, if maintained, as it most probably will be, constitutes a serious task of our educational system and requires that we make every effort to protect our scholars and research men so they can perform the teaching function which only they can do on the university level. Particularly, it is important that industry not hire all of them away from the university.

Nineteen professional engineering societies have moved into the new, 20-story, United Engineering Center on United Nations Plaza, New York, N. Y. The societies include the American Institute of Chemical Engineers, the Engineers Council for Professional Development, Engineers Joint Council, the Engineering Foundation, and the Engineering Societies Library.

The 11th Semi-Annual meeting and Midyear Conference of the Manufacturing Chemists' Association, Inc., will be held Nov. 21, in New York, N. Y. For information write the association at 1825 Connecticut Ave., N.W., Washington 9, D.C.

Co-Engineering Company of Boonton, N. J., announces the "Densitor," an instrument designed to measure continuously fluid density, unaffected by attitude, temperature, viscosity, pressure, or flow velocity. Specific gravity can be monitored to .001 units. The inventor is Howard W. Cole, Jr.

Cities Service Company and Columbian Carbon Company will merge, subject to approval of the shareholders.

The 4th International Congress on Rheology will be held Aug. 26-30, 1963, at Brown University, Providence, R. I., sponsored by the International Committee on Rheology and the Society of Rheology. Papers from rheologists are invited. For information: Prof. E. H. Lee, Editor of the Proceedings of the 4th International Congress on Rheology, Brown University, Providence 12, R. I.

— A Summary

Answers to the "Patent System Questionnaire"

Dr. D. B. Keyes, F.A.I.C.
480 Park Ave., New York 22, N. Y.

(The July, 1961, issue of The Chemist contained a questionnaire on the patent system. Here is the summary of the replies received.)

THE CHEMIST has a distribution of approximately 3750; as of October 1, 1961, thirty-eight replies had been received, or a little over 1% of those receiving the questionnaire.

Of the replies, 28 were from persons employed by "Profit Organizations"; 6 were self-employed; 4 were employed by "Non-profit Organizations," two of which were supported by taxes. I was interested to note that one-half of those who replied (19) had patented inventions in commercial use.

Starting with question No. 6 here is a statistical summary:

6. Only 2 out of 38 knew of any important inventions which had been "suppressed" by industrial concerns; no clear evidence to support these two statements was submitted.
7. Five out of the 38 believed that they had "heard" that our Government had commercially developed patented inventions. They gave no specific examples and while they may be correct, I have seen no evidence to this effect.
8. No one had ever heard of the Government "defending" one of its own patents.
9. Five out of 31 felt that even though the Government didn't defend patents which it owned, these patents were still of "some" financial value.
10. Everyone felt that the primary reason for Government Research Contracts was to solve a specific problem as quickly as possible, or at least they hoped so.
11. Everyone believed that the "best brains" available should be employed to solve these important national problems in science and engineering.
12. All but one (name and address not given) felt that private industry was in the best position to commercially develop new products for the public.
13. Only one (name and address not given) felt the inventions mentioned could have been developed sooner without patent protection.

My only conclusion is that there are few readers of THE CHEMIST who are interested in our patent system, but these few appreciate its importance and would like to see it retained.

TAPPI will hold its 1962 Annual Meeting at the Hotel Commodore, New York, N. Y., Feb. 19-22. For information: TAPPI, 360 Lexington Ave., New York 17, N. Y.

Florida Chemists & Engineers, Inc., and Microbiological Research & Consulting Laboratory have merged to form Science Associates, Inc., at 645 Rugby Ave., Orlando, Florida.

The Imbroglio of Academic Research

Dr. Jack P. Montgomery, Hon. AIC

Professor Emeritus of Organic Chemistry, The University of Alabama, Tuscaloosa, Alabama

(The author acknowledges indebtedness to *The Wall Street Journal*, New York, N. Y., for factual material and quotations.)

IT is estimated that by the middle 1960's, approximately half a billion dollars a year will be devoted to research in educational institutions and in off-campus endeavors connected with them. This does not include any direct space research. The U. S. Government will probably continue to be the most profligate of all the research sponsors. In addition, various foundations and business corporations make, and probably will even increase, enormous appropriations to the 150 or more institutions offering Ph.D. degrees. The colleges, themselves, devote at the present time about 150 million dollars of their own funds to research.

Some institutions budget up to 40% for research, and about 65% of Federal grants go into the doctorate program. Ever increasing amounts are being devoted to fellowships and scholarships awarded to both graduate and undergraduate students. Comparatively, a very small percentage of college funds is left for the undergraduate instruction of those who are ambitious to go on to graduate research.

In the light of predicted increases, the U. S. Office of Education warns that college enrollments could well double in the 1960's but the faculty strength may not increase more than 50%. Quoting the President of Princeton:

> Just at a time when there is a shortage of teaching scholars many of our ablest men are being drawn away from undergraduate education.

It is unfortunately largely true that scientific talent follows research money and that those who might have been outstanding science teachers spend less and less time in the class room. Many professors do no teaching at all below the graduate level. In all too many institutions undergraduate teaching is delegated to the younger and less experienced members of a department, frequently without the guidance of their more mature superiors.

The educational institutions themselves have, unwittingly perhaps, done a disservice to science teaching at the undergraduate level. They evidently do not agree with Jacques Barzun when he says, in *Teacher in America*:

> The American University System is built on the two false premises that all teachers must add to the existing stock of knowledge by research, and that all self-respecting institutions fulfill their role only by employing productive scholars.

When an important position is to be filled, the record of the prospect is more likely to be scanned for a list of his publications and an account of his contacts beyond the academic area than for his teaching talents. And all too often promotions are based upon a false idea of what creativity in teaching really is. Class room results seem to be a minor consideration.

There is danger that we are approaching a situation, if we are not already in the midst of it, where the allotment of monies from research grants will stultify research itself. Already serious complaints are heard that many candidates for advanced degrees do not have the adequate basic training which the teacher of graduate subjects knows must be had, to insure the efficiency and understanding upon which successful graduate work must depend. Graduate studies undertaken by holders of fellowships are often at a slow pace because of insufficient undergraduate momentum which might have been provided by more inspiring teaching. Budgeting of funds by the administration and then by department heads is always difficult. In the science departments some discouragement has prevailed just here in decisions as to allocations of funds to research activities or to undergraduate instruction. But budgeting of monies, necessary as it is, should not obscure the importance of budgeting of time and talents.

At present the argument seems to be that contact of students with devoted researchers will advance the general interest and worth of a particular field of endeavor. This argument would be quite sound if it were true that undergraduate students were given this advantage. Our students themselves are our most valuable primary resources, and if poorly processed at the undergraduate level, will be disappointing in the finished product. In most cases it is at the high school level that a sort of mining of our science students resources is done. The college undergraduate courses are expected to further work on the student material to form at least a desirable intermediate ready for refinement and adjustment into the finished product. If faulty and unskilled workmanship results in intermediates not up to specifications, the best efforts of the masters of the assembly line seeking a satisfactory product cannot result in the perfection desired. Failure in intense competition might well have been at the intermediate stage of operations.

The present practice in allocating research funds and, particularly, the budgeting of the time and talents of eminent scholars away from, rather than toward, undergraduate instruction has an adverse effect even in the high schools. The majority of high school science teachers must depend for the most part upon the instruction and inspiration received in

undergraduate college work. Even those who have had some postgraduate work in summer sessions have not had the great contacts which were hoped for from the masters hopefully brought in by administrators of research. Thus the present practice cuts two ways with damage both above and below the undergraduate college level. It would be well if the inspiration of the best teachers should be directed more and more to the undergraduate program, but if there is not more agreement to this, in fact as well as in theory, educational efforts in science will not only continue to be out of balance but the situation will worsen.

There is some basis for hope that this cannibalism of research, blindly making its own progeny the victims, is already somewhat on the wane. Fortunately there is a growing awakening from the former, and sometimes persistent, paramnesia, and awareness is sure to bring further remedies. Here and there, and may their tribe increase, we find administrators who still have the naive idea that the function of a teacher is to teach. Since in most cases, the donors of research funds expect results at the graduate and post graduate levels such funds can not well be used for undergraduate teachers' salaries. In an effort to meet this situation there seems to be a growing tendency for the college to reduce the budgeting of its own funds heretofore going to research and to apply the money toward greater efficiency in undergraduate instruction.

It has been well said that mere learning may preserve the errors of the past as well as its wisdom. Thus there ought to be in the class room a sifting to reject the false and the encouragement of mental and moral disciplines directed to the recognition of well-established realities, or even the challenge of these leading to new realities. If the research enthusiast has the talent or gift for this, then more of his time should be devoted to creative contacts with undergraduates and to close association with his colleagues who merely teach. The less this effort, the greater the need for wise and thoughtful selection and promotion of the teaching faculty.

"The expectant chrysalis denied the light fails in ecdysis to the new birth beauty which was its right."

The 28th Exposition of Chemical Industries will be held at the Coliseum, New York, N. Y., Nov. 27—Dec. 1. For information: 28th Exposition of Chemical Industries, 480 Lexington Ave., New York 17, N. Y.

The Visual Communications Congress will be held at the Biltmore Hotel, Los Angeles, Calif., Dec. 2-5. For information Visual Communications Congress, 18465 James Couzens Hwy., Detroit 35, Mich.

The Impact of the Professional Engineering Union

(Reprinted from *Engineering Employment Practices Newsletter*, published by the National Society of Professional Engineers, September, 1961.)

MUCH has been written about the pros and cons of engineering unionism, but little has covered the actual experiences of engineering unions in their collective bargaining relationships with employers.

The Impact of the Professional Engineering Union, by Purdue University Associate Professor Richard E. Walton, goes a long way toward filling this gap. Case studies of eleven large companies where professionals have organized certified bargaining units show the impact of unions upon engineer-management relations, working conditions and salaries and fringe benefits. The companies studied were firms with large research and engineering departments in the instrument, electronics, electrical equipment, aircraft, and petroleum industries. The engineers involved were for the most part engaged in large numbers in research and development work.

The conclusions of the study indicate that the engineers involved find union representation to be at best an uncomfortable solution to their problems, and that they tend to resist the use of many traditional union tactics. The specific effects of professional unionism as shown by the study include the following:

> Unions tend to strengthen merit raise provisions, but because of negotiated general salary increases, merit-raise provisions are confined to a smaller area. The importance of demonstrated skill and ability is usually depreciated in union layoff provisions.
>
> Union strikes, demonstrations and publications frequently damage the reputation of the company's engineering department, hurting recruiting and contract-getting programs.
>
> Because it is frequently in the union's interest to depict management as untrustworthy, issues which would not ordinarily be of major concern to engineers are fanned into serious disputes.

In addition, the book notes certain instances where the results of unionism are the exact opposite of the union's avowed aims: collective bargaining tends to freeze personnel programs rather than to allow desired experimentation; engineers wish separate treatment, but when they are unionized, management tends to treat them as they would any other group of workers; engineers wish their supervisors had more authority, but unionism pushes authority farther up the line; finally, while engineers wish to enhance their status, the study observes that in many instances unionization has had the opposite effect.

The Impact of the Professional Engineering Union, 419 pages, is available from Harvard Business School, Division of Research, Soldiers Field, Boston 63, Mass., for $5.00.

How to Lose Money On Creative Thinking

Dr. Johan Bjorksten, F.A.I.C.

Bjorksten Research Foundation, P.O. Box 775, Madison 1, Wisconsin

(The author writes, "At the hearings of a Senate Judiciary Committee, and on many other occasions a misconception has become apparent which is dangerous, because it may lead to unwarranted decisions. This is the misconception that a valuable idea in itself is an assurance of profits, and that patents necessarily are assets. This belief is prevalent because the successes, however few, are publicized, and the far more numerous disappointments don't make good news. Impelled by this misconception, individuals may risk more than they can afford, and legislators may enact laws which they would never have considered if fully appraised of the facts. I feel it a duty, therefore, to devote a few pages to an unpopular subject: How to lose money by creative thought.")

SO much has been written about the benefits of creative thought that the literature gives a distorted picture. While great rewards occasionally accrue, the would-be inventor should be warned that the road is tortuous and thorny and that rewards are few and far between. The Swedish poet, Victor Rydberg wrote:

We sense a prince
When a child smiles kind.
But grown-up kings
We never find.

In analogy, we might say:

We go in a dither
Creating a thought,
But ideas wither
And come to naught.

So the thought you nurse,
Which takes all you've got,
Can work in reverse
More likely than not.

Let us take three specific examples to illustrate the principal pitfalls:

1. Being right too early.
2. Publishing too early.
3. Underestimating the time and money needed.

Being right too early could be illustrated with a great many examples, beginning with the legendary Prometheus, but let us choose the discovery of anesthesia by Morton. This is a good example of the fact that a man may make a crucial contribution, and yet lose his all while others reap the rewards. The soporific effects of ethyl ether have long been known, but not that ether could be safely inhaled nor that general anesthesia would result. This discovery was demonstrated by William Morton so dramatically that it was immediately accepted by the notoriously careful and conservative medical profession. Morton, a dentist, was then 27 years old. His demonstration consisted in the painless removal of a vascular tumor from a jaw, previously regarded as an absolutely impossible feat.

Others had dabbled with anesthetics with inconclusive results. Having first worked out dosages and application conditions, Morton took the

full responsibility and staked his entire reputation on a public demonstration. For this contribution he earned the principal credit as the discoverer of anesthesia and this was the opinion of those of his contemporaries most competent to judge. Having made a key discovery of obvious value, Morton took out a patent, which was granted to him jointly with his teacher who had told him about the soporific effects of ether. The patent was infringed and disregarded by all, including the U. S. Government. Morton was not in a position to enforce it. A motion was introduced in Congress that a national award of $100,000 be made to Morton. This was held up by endless wrangling in committees until it died after 20 years, when the Civil War ended all attention to it. Morton died penniless, embittered, from a stroke which probably was brought about by the reading of a defamatory pamphlet issued in behalf of those who, after Morton's accomplishments, came running with their claims.

Publishing too Early: The pitfall of publishing too early is illustrated in the development of finishes for glass fibers. Ten years ago, glass-reinforced polyester plastics suffered from the drawback that they lost half of their strength when wet. Since almost all structural parts may be exposed to water or to high moisture, this made it necessary to use twice as much plastic and glass, resulting in doubled weight and doubled material cost. Luther L. Yaeger, working with Bjorksten Research Laboratories under contract from Wright Field, discovered that if a vinyl group could be attached to the glass and the halogen removed, the resultant bond would be immune to moisture. While others had made attempts along similar lines, and even mentioned vinyl chlorosilane in a context which would not give the desired result, Yaeger was the first to attain and practically demonstrate a way in which a firm, moisture-resistant bond could be achieved between the plastic and the glass fibers.

Had this discovery been kept secret, and a glass fiber treated with it had been made commercially available without disclosure of how it was made, at least until patents were issued, it is likely that Yaeger and his sponsors would have reaped the reward commensurate with the contribution. However, working under Government contract, publication was mandatory. A person who had a previous, non-operative disclosure, listing vinyl chlorosilane among a large number of other compounds, abandoned a patent application he had pending and filed in its place a new application into which he copied Yaeger's procedure, which made the entire process operative. A patent was issued to him, and litigation has gone on for many years. During all of this time, Yaeger and his sponsors have not

realized anything for their contribution, which is in general application throughout the world. On the contrary, they have been put to legal expenses in middle five figures.

Underestimating the time and money needed: This is perhaps the most common of all fallacies in the utilization and promotion of the results of creative thoughts. It is the most common reason an inventor loses the control of the results of his invention. Examples of this pitfall are so numerous, that I have made a composite of several cases, which I believe typical. The inventor found a new and simpler way to produce an improved plastic consumer article. To utilize his invention, he got together a few businessmen in his town, who put up $200,000. The inventor estimated that this should be entirely sufficient to set up a plant and go into production and sales. Under the agreement, the inventor was to receive 25% of the shares in the firm. Further, he was to be retained as president at a salary of $25,000 a year, plus a bonus of 10% of all profits. He would have the right to appoint 50% of the members of the Board of Directors. However, the contract contained the following clause:

> The present arrangement is based on the assumption that the sum of $200,000 furnished by the investors will suffice to bring about the successful operation of the Company. Additional money, if needed, may be furnished by the Investors entirely at their option, and then in return for a commensurate increase in the number of shares held by them. If the shares owned by the inventor at any time constitute less than 15% of the total shares of the Company, the stipulations regarding his employment and right to appoint directors shall become null and void.

This was accepted by the inventor, who was firmly convinced that the $200,000 would be ample. However, things did not get started quite as soon, nor as inexpensively, as had been expected. The building cost 50% more than expected; the price of machine installation had been underestimated. The greatest difficulty, however, proved to be in the delays between production and market acceptance. At the end of the first year the company showed a loss of $70,000. At the end of the second year, the working capital had vanished. While promising leads had been developed and some customers had begun to order in increasing volume, none the less the break-even point had not yet been reached. The company had to have more cash, or quit. The inventor tried to borrow, but found bankers and new investors unwilling to risk anything on the record he could show. Facing the choice between bankruptcy and loss of control, he accepted the latter.

The investors furnished an additional $200,000 and agreed to retain him as president. However, one of them was appointed vice president and

another treasurer, and they took control of the Board of Directors. The development of the company was still slow, and at the end of the third year the break-even point had barely been reached. Arguments had developed between the treasurer and the inventor. The treasurer, who had the benefit of retrospection, found fault with a number of equipment purchases, and with some development expenses which he considered too long-range for the present condition of the firm. The majority of the new board of directors sided with him, and so the inventor was eased out of employment with the company. The board then called a stockholders' meeting, and new shares for $4,000,000 were issued at a dime on the dollar. The inventor, who had put all his funds and used up all his credit in a desperate attempt to hold on to his control, had now no resources to take advantage of the offerings. Accordingly, his holdings were watered down to about 1% of the company. He had lost all control of the company he had founded, and his share in its subsequent success was rather fractional.

The sad thing about these examples, and many others, is that even with the benefit of retrospect it is difficult to see how these inventors could have fared better. It was not in Morton's power to postpone his invention to more propitious times. By not asserting himself in any way he would have saved himself much aggravation and might perhaps have received a modest reward in some indirect way. Yaeger would have been unable to withhold publication at an early stage, because he worked under Government contract. The inventor in the third case could find no other sponsors willing to advance even a similar amount of money on more lenient terms.

For the person working outside the framework of a manufacturing organization, it takes an unusual set of favorable circumstances, together with unusual sagacity, patience and persistence, to secure tangible rewards of creative thought. Then, do I mean to imply that creative thinking does not pay? Not at all! I shall write another article on the other side sometime. The point now is that so much has been said about the exceptional instances of spectacular success, that an altogether false picture of probabilities has been created in the minds of many. Anyone promoting an idea must be prepared to fight for it as he would fight for a child or a sweetheart, and to do so with the open-eyed realization that he may be hurt severely and may not live long enough to see his idea rewarded or even recognized.

Communications

Good Chemists Never Quit

To the Editor:

As you must realize, many readers of THE CHEMIST appreciate the high quality of the articles which you choose for publication, but on occasion some one article stands out as exceptional. Such an article is "Good Chemists Never Quit," by Dr. William J. Sparks, Hon. AIC, in the October issue.

We are all familiar with the so-called "statistical proof" that creative scientists, like prize fighters, are only productive in their younger years. Dr. Sparks has done a splendid job demonstrating with statistics that this is not so. All older members of the AIC should read his article and write him a note of thanks.

Dr. Sparks goes on to explain that famous chemists may acquire fame and self-satisfaction in two widely different fields of endeavor. One, in chemistry and the other in the application of the science for the good of all. The latter field usually consists in getting many others to make the necessary application.

Two of my old friends, both no longer with us, were excellent examples of whom Dr. Sparks has in mind. One was the world famous physical chemist, Gilbert N. Lewis, who did so much in the field of chemical thermo, and the other equally famous chemist, Charles H. Herty (mentioned by Dr. Sparks), who did so much to save our synthetic organic chemical industry after World War I. Both were energetic crusaders; both were intolerant of ignorance and stupidity; both were fighters in the true sense of the word; both never quit working until the end; and yet, because of their widely different fields of endeavor, I doubt that the ardent admirers of one admired or even had heard of the other.

The other evening at an AIC Council Meeting, one of the Councilors asked us which type of chemist, as illustrated above, was the Institute primarily interested in. Dr. Sparks, who was present, expressed no opinion, but perhaps your readers have

one and would enjoy telling us.

Anyway we can all agree with Dr. Sparks, "Good Chemists Never Quit."

—Dr. Donald B. Keyes, F.A.I.C.
New York, N. Y.

To the Editor:

The article by Dr. Sparks in the October CHEMIST, "Good Chemists Never Quit," is an excellent presentation of information indicating that the creativity of scientists continues after the age of 35. I would suggest that this article be given wide circulation through the efforts of one of the committees of the AIC.

—H. F. Schwarz, F.A.I.C.
Chicago 28, Ill.

Public Hope and Conjecture

To the Editor:

After reading the articles on patents in THE CHEMIST, I enclose a reproduction of an article. It shows what is going on in our neighborhood, as this is a local section paper.

—H. R. Berlt, F.A.I.C.
Chicago, Ill.

Note: The article, from *The Sunday Star*, is entitled, "N. Side Inventor Claims Success," and concerns an invention by Harry Johanesen of a carburetor, claimed to "guarantee up to 130 miles to the gallon on compact cars; 65-70 miles per gallon on ordinary automobiles. The article concludes: "If the carburetor is successful, one of three things will happen; the 3-man partnership will sell the invention at a fabulous price; they will contract with a manufacturer and live on the royalties, or it will be purchased . . . for suppression, since it would knock the sale of gasoline down . . ."

Writing Style and Content Are Appreciated

To the Editor:

I have read the articles in the June and July issues of THE CHEMIST and I found in each an article which was not only a good study example of scientific writing, but which was aiso very important at this time to me. I refer to the articles concerning "professional status" by Dr. Alden Emery in the June issue and by Dr. Lawrence T. Eby in the July issue. Their articles were very interesting.

—Preston H. Baugh
Louisville 17, Ky.

New Products Wanted

To the Editor:

We are in the market for any new or unusual items or products recently developed. Kindly post this letter on your bulletin board for benefit of any who would like to contact us.

—H. Goldsmith
Western World Products
2611 Tilden Ave.,
Los Angeles 64, Calif.

British Version

From *The Atomic Weapons Research Establishment News* (London), via *The New York Times Magazine*, Nov. 6, 1960, we take the following glossary of words which "will assist those with limited experience in sitting in judgment on their fellow men":

Assessment	*Meaning*
Hardworking	dirty lab coat
Ambitious	likes money
Overambitious	wants to be paid as much as me
Energetic	b----y nuisance
Confidential	well-known
Abtruse	mumbles
Bright	agrees with me
Acute	blonde (fem. only)
Academic	once read a book
Concrete ideas	all mixed-up and set solid
Good manager	gets others to do the work
Many contacts	bookmaker's runner
Good organizer	agent for carpets, washing machines and cigarettes
Imaginative	member of Society for Psychical Research
Forceful	shouts
Observant	watches the girls
Unobservant	near retiring age
Good committee man	sleeps upright
Poor committee man	sleeps horizontal
Reflective	sleeps anywhere
Many outside interests	watches television

Dr. Andrew J. Bartilucci, F.A.I.C., dean, St. John's College of Pharmacy, Jamaica 32, N. Y., announces that a limited number of the papers delivered at the Industrial Panel of the 1961 Pharmacy Congress are available. Titles are "The Stability of Suspensions," "Survey of Quality Control Procedures Applicable to Pharmaceutical Semi-Solids," "Evaluation of Pharmaceutical Emulsions," and "Maintaining the Stability of Solids."

Heino A. Luts, M.A.I.C., president of Structure-Activity Research, Inc., College Hill, Oxford, Miss., announced the official opening of these laboratories on Oct. 1, 1961. The firm is "a research organization of scientists dedicated to servicing the needs of the nation's rapidly growing chemical-medicinal industry." Its laboratories contain modern apparatus for experimentation and large stocks of organic intermediates. Working in cooperation with the University of Mississippi, research and development, technical services, consultation and literature surveys, are offered.

Dr. Joel H. Hildebrand, Hon. AIC, professor emeritus of chemistry at the University of California, will receive the 1962 Priestley Medal of the American Chemical Society, "for distinguished services to chemistry." Presentation will be made at the Society's 141st national meeting in Washington, D.C., in March.

Professional Appointments

Nov. 2, 1961. Philadelphia, Pa. Engineer's Club. Dinner meeting of Philadelphia Chapter. Speaker, Dr. James L. Jezl, Manager, Basic Research, Avisun Corp., who is the present chairman of the Philadelphia ACS Section. Subject, "Basic Research on Polyolefins." For reservations: Dr. Justo B. Bravo, Research & Development Div., Sun Oil Co., Marcus Hook, Pa. Telephone: HU 5-1121, Ext. 627.

Nov. 8, 1961. Los Angeles, Calif. Roger Young Auditorium. Meeting of Western Chapter. Subject: Registration & Licensing of Chemists. For information, George H. Dye, Pennsalt Chemicals Corp., 2700 South Eastern Ave., Los Angeles 22, Calif. Telephone: RA 3-9711, Ext. 29.

Nov. 9, 1961. New York, N. Y. The Chemist's Club, New York Chapter Meeting. Dinner 6:30 p.m. Speaker, Dr. Henry B. Hass, F.A.I.C. Subject, "Chemistry in Government." Reservations, Dr. Kurt S. Konigsbacher, MU 3-0071.

Nov. 14, 1961. Washington, D.C. O'Donnell's Sea Grill, 1221 E St., N.W., Luncheon Meeting of Washington Chapter. For information, Donald C. Holmes, chairman of program committee, 121 No. Wakefield St., Arlington 3, Va. (Telephone: Office OX 7-9809; Home, JA 7-5123.)

Nov. 14, 1961. Cleveland, Ohio. Cleveland Engineering & Scientific Center, 3100 Chester Ave. 13th Annual Dinner of the Chemical Profession of Cleveland. Social hour 6:00 p.m., dinner 7:00 p.m. Sponsoring groups are the AIC, the ACS, AIChE, Alpha Chi Sigma, Electrochemical Society, and the Chemical Sales Club. Speaker: Dr. Carl F. Prutton. Subject, "Our Chemical Heritage." For information: Harry R. Calsing, c/o The B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio. (UTah 1-8200, Ext. 397).

Dec. 12, 1961. Washington, D.C. Army-Navy Town Club. Dinner meeting of Washington Chapter. For information, Donald C. Holmes, chairman of program committee, 121 No. Wakefield St., Arlington 3, Va. (Telephone: Office OX 7-9809; Home, JA 7-5123.)

Jan. 10, 1962. Los Angeles, Calif. Roger Young Auditorium. Meeting of Western Chapter. Subject: Legal Definition of a Chemist. For information: George H. Dye, Pennsalt Chemicals Corp., 2700 South Eastern Ave., Los Angeles 22, Calif. Telephone: RA 3-9711, Ext. 29.

Feb. 1, 1962. Philadelphia, Pa. Penn Sherwood Hotel. Philadelphia Chapter. Honor Scroll Award Dinner. Recipient to be announced. For reservations: Dr. Justo B. Bravo, Research & Development Div., Sun Oil Co., Marcus Hook, Pa. Telephone: HU 5-1121, Ext. 627.

Mar. 14, 1962. Los Angeles, Calif. Roger Young Auditorium. Meeting of Western Chapter. Subject: Labor Unions for Chemists. For information: George H. Dye, Pennsalt Chemicals Corp., 2700 South Eastern Ave., Los Angeles 22, Calif. Telephone: RA 3-9711, Ext. 29.

April 5, 1962. Philadelphia, Pa. Engineer's Club. Dinner Meeting of Philadelphia Chapter. For reservations: Dr. Justo B. Bravo, Research & Development Div., Sun Oil Co., Marcus Hook, Pa. Telephone: HU 5-1121, Ext. 627.

May 3, 1962. Valley Forge, Pa. Tally-Ho Motel-Hotel, on Route 202. Meeting of Philadelphia Chapter. Student Award Dinner. Speaker, Dr. Charles C. Price, Director, John Harrison Lab., University of Pennsylvania. Teachers and parents of awardees invited. For reservations, Dr. Justo B. Bravo, Research & Development Div., Sun Oil Co., Marcus Hook, Pa. Telephone: HU 5-1121, Ext. 627.

May 9, 1962. Los Angeles, Calif. Roger Young Auditorium. Meeting of Western Chapter. Student Awards will be presented. For information, George H. Dye, Pennsalt Chemicals Corp., 2700 South Eastern Ave., Los Angeles 22, Calif. Telephone: RA 3-9711, Ext. 29.

May 10-11, 1962. Chicago, Ill. Edgewater Beach Hotel. 39 Annual AIC Meeting. The Chicago Chapter will be our host. H. F. Schwarz, Sherwin-Williams Co., 116th St. & Champlain Ave., Chicago 28, Ill., is chairman of the General Arrangements Committee.

New York Chapter Recognizes Service to Science Education

The New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS presented Honor Scrolls, May 25, 1961, to Dr. Alvan H. Tenney, manager, Market Research Department, Union Carbide Chemicals Co., New York, N. Y., and to Samuel Schenberg, director of science for the New York City schools, for their services to science education.

Dr. Tenney was introduced by John Conway, division manager, Chemicals Purchasing Department, Union Carbide Corporation. Mr. Schenberg was presented by Fred Schoenberg, associate superintendent, High School Division, Board of Education, City of New York.

Dr. John L. Hickson, vice president, Sugar Research Foundation, Inc., and chairman of the Chapter presented the Honor Scrolls to the two recipients. Dr. Tenney responded with an informal address on "Buying Tomorrow's Brains Today." Mr. Schenberg presented a paper on "Changing Science Patterns in the 1960's." (See this issue.)

Dr. Tenney, who holds the degrees of B.S., Ch.E., and Ph.D. from Columbia University, has long maintained a continuing interest in education, serving in numerous guidance conferences at schools and colleges arranged by the New York Engineers Committee on Student Guidance (of the Engineers Council for Professional Development), the Technical Societies' Council of New York, and the American Institute of Chemical Engineers. He is a general member of the New York State Citizen's Committee for the Public Schools, and recently served as chairman of the Curriculum Advisory Committee of the New York Section of the American Chemical Society, making a study of chemistry curriculum needs and facilities in the New York City public school system.

Mr. Schenberg holds the B.S. degree in chemical engineering from Massachusetts Institute of Technology; the LL.B. degree from Brooklyn Law School, and the M.A. degree from New York University. He became supervisor of science for the High School Division of the New York City Board of Education in 1949, and director of science in 1958. A partial list of his activities includes arranging work-shop courses for teachers, helping them to find summer employment, working with scientific professional societies to improve science teaching, serving as a member of the Advisory Committee on Science of the New York State Education Department, contributing to education for civil defense, advising private firms on their educational activities, and publishing numerous articles.

The citation on the Honor Scroll to Dr. Tenney reads:

To Alvan H. Tenney

For extraordinary service to the chemical profession and to the community interested in science education. For stimulating leadership in the task of improving secondary high school science education.

Mr. Schenberg's Honor Scroll reads:

To Samuel Schenberg

For outstanding contributions to science education in the New York City school system. For continued faithful, loyal dedication to the establishment of high quality science instruction.

Dr. L. E. Craig, F.A.I.C., with the chemical division of John Deere Chemical Company, since 1954, is now director of research and technical service for the company, which has plants in Pryor and Tulsa, Oklahoma.

Chemical Books Abroad

By Dr. Rudolph Seiden, F.A.I.C.

Editio Cantor, Aulendorf: *Rote Liste* 1961, by Bundesverband der Pharmazeutischen Industrie; 1132 pp.—The latest edition of this official "red book" of the German pharmaceutical industry again gives valuable information about composition, indications, dosage, unit sizes and prices, and manufacturer's name for each of many thousand of preparations.

Akad. Verlagsges. Geest & Portig, Leipzig: *Die organische Analyse*, by H. Bauer and H. Moll; 4th ed., 691 pp.; DM 35.—A most informative and practical text- and work-book which covers the whole field of organic analysis in 30 well-arranged and well-written chapters: from the determination of the elements and simple saturated hydrocarbons to the complicated amino acids, polysaccharides, proteins, fats, alkaloids, hormones, vitamins, and antibiotics.

Dr. Alfred Huethig Verlag, Heidelberg: *Wasser als Loeschmittel*, by O. Herterich; 1960, 247 pp. (98 ill.); DM 28.—An expert explains how—and when—to use water to extinguish the various types of fire. Has 316 literature references.

Cleaver-Hume Press, London: *Mineral Use Guide*, by R. H. S. Robertson; 1960, 44 cards; 21 s.—With the help of 32 ingeniously arranged diagrams, 52 of the most important mineral raw materials—from Agate to Zircon—are described in regard to technology, properties, and utilization. A valuable reference work which gives at a glance the answer to most, if not all, questions concerning useful minerals.

A. W. Broggers, Oslo (Hafner Publishing Co., New York): *Practical Mycology*, by S. Funder; 2nd ed., 144 pp., $6.50—This richly and exquisitely illustrated manual for identification of the most common fungi is addressed not only to mycologists, but also to other professional men, particularly those who are engaged in diagnosing and controlling pathogen-caused diseases of man, animals, and plants.

Butterworth & Co., London (Washington, D.C.): *Digestive Physiology and Nutrition of the Ruminant*, by D. Lewis; 1961, 306 pp.; $9.50—This book records the proceedings and discussions of the 7th Easter School in Agricultural Science, held at the University of Nottingham in 1960. A large number of British experts lectured on the role played not only by the rumen and its microbial flora but also by the remainder of the alimentary tract in the digestion of feedstuffs and the complicated metabolic processes going on in ruminants.

Benn Brothers, London: 1961 *Chemical Age Directory and Who's Who;* 318 pp.; 42 s.—A well-known British reference work listing the chemical organizations, research institutes, chemistry departments of universities, trade names, and, last but not least, leading chemists and chemical engineers (with biographical data); a diary and a buyer's guide are bound into this big desk book.

The United States Stoneware Company has moved its engineering laboratories to a newly-acquired building at 2664 Gilchrist Road, Akron, Ohio, where activities will be broadened in the field of research in packed tower design and operation.

David W. Young, F.A.I.C., research associate, Sinclair Research, Inc., Harvey, Ill., will receive the Merit Award of the Chicago Technical Societies Council, at a dinner, Nov. 28, at the Furniture Club, Chicago, Ill. The award is made annually on the basis of civic and community contributions of the recipients as well as their scientific achievements. Mr. Young is chairman-elect of the Chicago AIC Chapter. He is a member of the Education Committee of the Chicago Section of the ACS, and a member of its Speaker's Bureau. He is a consultant for the U. S. Air Force and the Chicago Art Institute. A talented violinist, he plays his Stradivarius in the Chicago Heights Symphony Orchestra and at Glee Club Concerts.

Dr. Linwood F. Tice, F.A.I.C., dean of pharmacy, Philadelphia College of Pharmacy & Science, Philadelphia, Pa., is one of the judges for the 1962 Lunsford Richardson Pharmacy Awards, cash prizes made to undergraduates and graduate pharmacy students. The Awards are sponsored by four units of Richardson-Merrell, Inc.; The Wm. S. Merrell Co., National Drug Co., Vick Chemical Co., and Walker Laboratories.

Dr. Frederick G. Sawyer, F.A.I.C., vice president of Jacobs Engineering Co., Pasadena, Calif., announces the formation of a subsidiary, Jacobs Constructors, Inc., for construction and maintenance of process plants.

Dr. Roland A. Bosee, F.A.I.C., Captain, Medical Service Corps, U. S. Navy and director, Air Crew Equipment Lab., Naval Air Material Center, Philadelphia 12, Pa., presented a paper on "Chemicals for Closed System Respirable Oxygen and Potable Water from Recycled Metabolic Wastes for Use in Space Flight or Nuclear Fall-out Shelters," at the 16th Annual Meeting of the Armed Forces Chemical Association, Washington, D.C.

Warren B. Blumenthal, F.A.I.C., is the author of *Branch of Almond* (The Life and Times of Jeremiah), published by Bookman Associates, New York, N. Y. He has made a lifetime avocation of the study and teaching of the Bible. He is chief of chemical research for the Titanium Alloy Manufacturing Division of National Lead Co., Niagara Falls, N. Y., and is also the author of scientific works, including *The Chemical Behavior of Zirconium.*

Opportunities

Doris Eager, M.A.I.C.

Chemists Available

Industrial Pharmaceutical Chemist available on per diem basis. Licensed professional engineer N. Y. State. Experience includes technical and commercial aspects of the drug industry, entirely familiar with professional literature, government regulations in narcotics, alcohol and pesticides, all regulations related to Food & Drug Act, especially labels and labeling. Box 110, THE CHEMIST.

Research Chemist. F.A.I.C., Research & development of industrial cleaning compounds, rust & corrosion preventives, alkaline & acidic descalants, control of water pollution & waste disposal. Experience includes group leader in research & development, technical director. Location open. Box 112, THE CHEMIST.

Market Promotion & Public Relations Executive managing international & domestic operations in major industrial firm desires challenging new opportunity. 13 years experience market research, commercial development, advertising, public relations in electronics, plastics, chemicals & specialties. F.A.I.C. Box 114, THE CHEMIST.

Purchasing Executive. 10 years experience as department head & consultant for international chemical engineering-construction company; 2 years experience chemical manufacturer, including sales, market research, production. Excellent knowledge of Brazilian industrial potentialities and Portuguese. Box 116, THE CHEMIST.

Liaison, Research, Consulting. F.A.I.C., chemical research in catalysis, physical chemistry, rocket fuels. Diversified advisory - development - organizing activity with slant to wood & minerals, heading state supported college advisory agency for industry. Interested in research, development, public relations, writing. John M. Sayward, Randolph, Vermont.

Positions Available

National Sales Manager for company (sales volume ranges 50-100 million) selling inorganic & organic chemicals to plastic, paper, ceramic, electronic, textile, etc., industries. Headquarters in New York City, travel nationally. Excellent opportunity. Box 111, THE CHEMIST.

Director of Marketing, must have had a successful record as Marketing Director in field of bulk and industrial chemicals, have ability to develop new business contacts, to exercise sound judgment, to plan and direct efforts of others. Compensation $20-25,000. Box 113, THE CHEMIST.

Chemist, experienced in food, soap and/or detergent analysis. Salary $100. Take typed resume, Hearst Magazines, Personnel Office, 309 West 56th St., N. Y. 19, N. Y.

Career Professional Positions in Aerospace Technology, salaries $5,335 to $21,000 a year for work in research, development, design, operations, and administration; or in physical sciences, engineering and mathematics. For details write NASA Boards of U. S. Civil Service Examiners, at Mountain View, Calif.; Greenbelt, Md.; Hampton, Va.; Cleveland 35, Ohio; Huntsville, Ala. For positions ranging from $15,255 up, write NASA, Washington 25, D.C.

Board of U. S. Civil Service Examiners, NASA, announces examination for **Chemist** in general, physical, organic & analytical, & inorganic chemistry. GS-5, $5,335 through GS-15, $13,730. Write for details; Geo. C. Marshall Space Flight Center, Huntsville, Ala.

Diamond Alkali Company dedicated its new research center in October, on a thirty-acre site in Concord Township, Ohio. Four buildings, including the 75,000 sq. ft. Research-Administration building and the 3250 sq. ft. High Pressure Laboratory, have been completed. Increasing emphasis is being placed upon new product research. The new "Dacthal" herbicide, xylene chemicals, and substantial modifications of polyvinyl chloride, represent some of the results of the accelerated research. Diamond believes that the new research environment is ideally conducive to productive work in the future.

Dr. R. Norris Shreve, F.A.I.C., professor of chemical engineering, Purdue University, Lafayette, Ind., was honored at the Purdue Commencement in June with an Honorary Doctorate of Engineering. He was cited as: "Distinguished contributor to the development of chemical industry and the education of chemical engineers, and, at once, scientist, teacher, administrator, and author, in recognition of his signal service to this University and the Formosa-Purdue Engineering Project and to his profession both in this country and abroad."

Dr. Glenn T. Seaborg, Hon. AIC, chairman of the U. S. Atomic Energy Commission, made the principal address at a dinner following the dedication ceremony of the new "Hall of Elements," opened September 12, at the Museum of Science & Industry in Chicago, Ill. The "Hall of Elements" was presented to the Museum by the Union Carbide Corporation.

Dr. John A. King, F.A.I.C., has been appointed manager of research and development of the Agricultural Division of American Cyanamid Company, New York 20, N. Y. The Division's new Agricultural Center is located near Princeton, N. J.

Dr. Harvey A. Neville, F.A.I.C., formerly vice president and provost, has been selected as the ninth president of Lehigh University, Bethlehem, Pa. He came to Lehigh in 1927.

Dr. Rudolph Seiden, F.A.I.C., a vice president of Lockhart Laboratories, Kansas City 41, Mo., has been appointed assistant editor of The Chemical Abstracts Service. The Spanish edition of Dr. Seiden's *Poultry Handbook* has just appeared in Mexico. The Spanish edition of his *Livestock Health Encyclopedia* was issued last year in Argentina, and a new English edition was published this summer. He is chairman of the midwest section of the Animal Health Institute.

Mona Oser, F.A.I.C., was honored recently at a reception in celebration of the 35th anniversary of her association with Food & Drug Research Laboratories, Inc., of Maspeth, New York, N. Y. She has been successively biologist, chief biologist, administrative assistant, and currently is vice president of the Laboratories.

John B. Mellecker, F.A.I.C., is now chemical industry consultant with McCann-Erickson, Inc., 485 Lexington Ave., New York, N. Y.